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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/Gradation/2014-15

08.08.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements and Asphalting to HMT Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VP/33/2014-15 Dated: 05.08.2014

Date of Testing : 08.08.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25500**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	925	925	3.6	96.4	95-100
22.4	5210	6135	24.1	75.9	60-80
11.2	5810	11945	46.8	53.2	40-60
4.75	4255	16200	63.5	36.5	25-40
2.36	4020	20220	79.3	20.7	15-30
0.600	2510	22730	89.1	10.9	8-22
0.075	2470	25200	98.8	1.2	0-8

Note:

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Bitumen/2014-15 23.08.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP,
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements and Asphalting to HMT Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	AEE/VP/33/2014-15 Dated: 05.08.2014
SAMPLE I/D	Asphalting to HMT Layout road in Ward No.09.
DATE OF TESTING	23.08.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474.5	474.5
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.5	25.50
7. Bitumen content in %	5.10	5.10
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	38.26	8.06	8.06	91.94	90-100
4.75	262.3	55.28	63.34	36.66	35-51
2.36	52.15	10.99	74.33	25.67	24-39
1.18	44.23	9.32	83.65	16.35	15-30
0.3	28.54	6.01	89.67	10.33	9-19
0.075	28.13	5.93	95.60	4.40	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	32.52	6.50	6.50	93.50	90-100
4.75	241.5	48.30	54.80	45.20	35-51
2.36	91.25	18.25	73.05	26.95	24-39
1.18	53.25	10.65	83.70	16.30	15-30
0.3	30.25	6.05	89.75	10.25	9-19
0.075	28.55	5.71	95.46	4.54	3-8

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08.08.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements and Asphalting to HMT Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VP/33/2014-15 Dated: 05.08.2014

Date of Testing : 08.08.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25455**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	900	900	3.5	96.5	95-100
22.4	5250	6150	24.2	75.8	60-80
11.2	5795	11945	46.9	53.1	40-60
4.75	4245	16190	63.6	36.4	25-40
2.36	4010	20200	79.4	20.6	15-30
0.600	2505	22705	89.2	10.8	8-22
0.075	2450	25155	98.8	1.2	0-8

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09.08.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements and Asphalting to HMT Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VP/33/2014-15 Dated: 05.08.2014

Date of Testing : 09.08.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25105**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	850	850	3.4	96.6	95-100
22.4	5150	6000	23.9	76.1	60-80
11.2	5650	11650	46.4	53.6	40-60
4.75	4215	15865	63.2	36.8	25-40
2.36	3895	19760	78.7	21.3	15-30
0.600	2610	22370	89.1	10.9	8-22
0.075	2350	24720	98.5	1.5	0-8

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/AIV/2014-15

08.08.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to HMT Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VP/33/2014-15 Dated: 05.08.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	08.08.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	303	302	
4	Aggregate Impact value = percent fines	21.30	21.76	
	100* (W_2/W_1)%			21.48

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/S-T/2014-15 08.08.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of Work	Improvements and Asphalting to HMT Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VP/33/2014-15 Dated: 05.08.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	08.08.2014

Result : Flakiness Index = **11.60%**

Elongation Index = **13.23%**

Result : Combined Flakiness & Elongation index 24.83%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/AIV/2014-15

23.08.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to HMT Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VP/33/2014-15 Dated: 05.08.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	23.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	84.5	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.02	22.22	22.12

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Shape_T/2014-15 : 23.08.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**: Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**: Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements and Asphalting to HMT Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: AEE/VP/33/2014-15 Dated: 05.08.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 23.08.2014

Result : Flakiness Index = **11.55%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **24.80%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Stripping/2014-15 23.08.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements and Asphalting to HMT Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VP/33/2014-15 Dated: 05.08.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	23.08.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.3	3.30	96.70
2	3.4		
3	3.2		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Sp_Wa/2014-15 23.08.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to HMT Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VP/33/2014-15 Dated: 05.08.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	23.08.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2020	2021	2022	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1265	1266	1267	
4	Weight of saturated surface dry aggregate in air	W_3 g	2005	2006	2008	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	740	740	741	
6	Weight of oven dried aggregate	W_4 g	1990	1992	1993	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.689	2.692	2.690	2.690
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.745	2.744	2.745	2.745
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.75%	0.70%	0.75%	0.74%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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